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A SECOND SPECIES OF AMMOBROMA (LENNOACEAE), IN SINALOA, MEXICO

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The genus *Ammobroma* has stood as a monotypic taxon since its initial description more than a hundred years ago (Gray, 1854). Its single species, *A. sonorae,* has through the years attracted much casual attention because of the curious, mushroom-like appearance of the plant, and because of its early use as an edible plant by some of the indigenous Indian tribes of the Sonoran region. It is of some interest to note that Dr. Jerry Rzedowski has observed the use of *Lennoa* also as a vegetable in the State of San Luis Potosí (personal communication). Notwithstanding the obvious interest in these bizarre parasites very little botanical work has been done in the family.

It is not our intention here to enter into a discussion of the generic distinctions between the three known genera of Lennoaceae *(Ammobroma, Pholisma,* and *Lennoa).* Even a casual acquaintance with *Pholisma* and *Lennoa* leaves one with an uneasy feeling about their validity as genera. It could even be argued that the main generic feature of *Ammobroma,* i.e., the compact, laterally extended head, is insufficient by itself as a generic distinction.

Whatever generic delimitations may be used in the future, it is of great interest that we can now add a new species to this small family. At present the species must undoubtedly be placed in *Ammobroma.* The plant was first observed by the senior author in December, 1949, in the region of Culiacán, Sinaloa. Only dried and decomposed remains were found at that time. It could be ascertained, nevertheless, that the plants were attached to the roots of *Euphorbia (Agaloma) californica.* More recently (August, 1957), a second visit was made to the same locality, and many flowering plants were found on the roots of *Euphorbia californica, Jatropha curcas,* and *J. cordata.* As now known, the parasite is

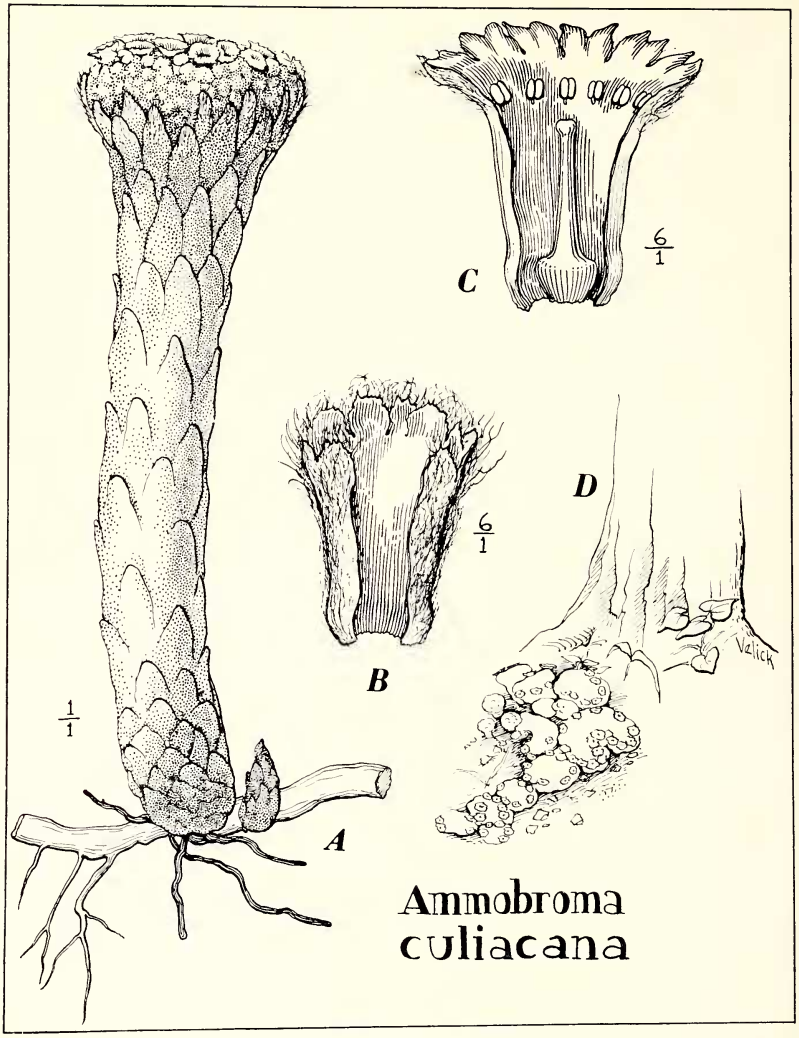

FIG. 1. *Ammobroma culiacana:* a, complete plant on root of host plant, showing you shoot and the roots of the parasite; b, calyx, split open; c. corolla, split open to show pistil and anthers; d, a clump of plants as seen in nature (from a kodachrome).

quite local, having been found only on a rocky ridge about 15 km south of Culiacán, from which we derive the specific epithet.

Ammobroma culiacana Dressler & Kuijt, n. sp. Caules carnosi, 8–10 cm longi, 1.5–2.0 cm crassi, orientes e radice nutricia ipsa vel paene; folia squamiformia, parva, basalia deltoideo-ovata glabraque, media longiora, superiora circa basim inflorescentiae involucrum efformantia. Inflorescentia capitulum compactum, 3–10 cm diam., hemi-

sphaericum, suborbiculare sed demum circumscriptione irregulari. Flores sessiles vel breviter pedicellati; calyx tubulosus, extra dense pilosus, praecipue superne, 5–5.5 mm longus, incisus ad 1.5–2.5 mm, lobis 6–8, obtusis, irregulariter dentatis, 1–2 mm latis. Tubus corollae 6–6.5 mm longus, glaber; lobi corollae 6–8, patentes, bifidi, plicati, 2.5–3 mm longi, 1.5–2 mm lati, intra glabri, extra sparse pilosi; stamina isomera, lobis corollae alternantia. Filamenta 0.3 mm longa, autherae ca. 0.7 mm longae; ovarium turbinatum, ca. 1.8 mm latum. Stylus ca. 4 mm longus, stigma integrum, capitatum. Fructus semiglobosus, 3–3.5 mm diam.; nuculae 14–18, reniformi-ovoideae, applanatae, ca. 1 mm longae; testa cellulis magnis, papillosis.

Stems fleshy, 8–10 cm long, 1.5–2.0 cm in diameter, arising directly from the infected host root or nearly so; leaf scales small, the basal ones deltoid-ovate and glabrous, the middle ones longer, the upper ones forming an envelope of densely pilose, linguiform to ovate, imbricating scales around the base of the florescence. Inflorescence a compound head 3–10 cm in diameter, hemispheric, more or less circular, but becoming irregular in outline. Flowers sessile or shortly pedicellate, calyx tubular, densely pilose without, especially on upper parts, 5–5.5 mm long, divided for 1.5–2.5 mm into 6–8 obtuse, irregularly dentate lobes 1–2 mm in width; corolla tube 6–6.5 mm long, glabrous; corolla lobes 6–8, spreading, bifid and plicate, 2.5–3 mm long, 1.5–2 mm wide, glaborus within, somewhat pilose without, stamens as many as corolla lobes and alternating with them. Filaments 0.3 mm long, anthers ca. 0.7 mm long, ovary turbinate, ca. 1.8 mm wide; style ca. 4 mm long, stigma entire, capitate. Fruit subhemispheric, 3–3.5 mm in diameter, nutlets 14–18, reniform-ovoid, flattened, about 1 mm long, seed coat consisting of large, papillose cells.

Specimens examined. Mexico. Sinaloa: about 15 km south of Culiacán (km 1410), rocky soil in thorn forest, parasitic on roots of *Euphorbia californica, Jatropha curcas* and *J. cordata,* indument and exposed bracts pink, flowers cream with pink shading, *Dressler 2175* (F, GH, K, MEXU, MO, NY, UBC, UC-holotype, US, VEN), Aug. 11, 1957; 10 miles south of Culiacán, rocky thorn forest, parasitic on roots of *Euphorbia, Dressler 984* (MEXU, MO, UC, US), Dec. 22, 1949.

Ammobroma culiacana differs from all other known Lennoaceae in its gamosepalous clyx. The remaining members of the family, including *A. sonorae,* have very narrow sepals which are free to the base or nearly so. The matted indument of the sepals gives the heads a flesh-pink color in life. The corollas are cream or tinged with pink and, unlike those of other Lennoaceae, do not contrast markedly with the pale indument of the head. A faint, sweet odor was detected, and the flowers were visited by flies, beetles, and small butterflies. As the inflorescence matures and expands laterally the (earliest) flowers in the central portion become dark brown. The entire perianth persists even when the fruit is mature. The latter, in agreement with other Lennoaceae, is a capsule-like fruit which appears to open by means of an irregular, circumscissile rupture.

It seems that mechanical destruction of old inflorescences is necessary before the seeds are set free.

The inflorescence of *Ammobroma culiacana* may be said to be somewhat intermediate between those of *A. sonorae* and the *Pholisma-Lennoa* complex. In the latter two genera we find a panicle-like inflorescence in which the balance between lateral and terminal expansion has been variously struck. *Lennoa* and *Pholisma depressum (P. paniculatum* Templeton) show a great deal of lateral branching (Suessenguth, 1927; Templeton, 1962), but in *P. arenarium* the inflorescence approaches a short, dense spike. In *Ammobroma culiacana* a further contraction has taken place, and we can speak of a determinate, disk-like inflorescence axis and an involucre of bracts. The extreme is reached in *A. sonorae* with a very dense capitulum the margin of which unrolls well above the upper leaves. Reduction of floral bracts seems to run parallel to this series: in *Pholisma* and *Lennoa* each flower has a subtending bract but such organs are no longer recognizable in *Ammobroma,* at least not in the central area of the disk.

Although details of root morphology cannot be ascertained at this time, one interesting feature is clearly shown in the collections cited, and is illustrated in Fig. 1A. The stem originates directly from the host root, or nearly so. On the basis of what is known for *Pholisma* (Kuijt, 1968) and the collections cited, we can tentatively reconstruct the following course of events in *Ammobroma culiacana.* Long roots traverse the soil. When the host rhizosphere is invaded, small haustorial roots are formed nearest the host root and grow towards the latter, finally invading it. A dark, irregular, tubercular mass of variable size develops in the haustorial region. It is from this callus-like cushion that the stem is developed. This is in direct contrast to the situation in *Pholisma,* where stems arse from the roots of the parasite between successive haustorial attachments, but not at the point of host contact. The parasitism of *A. culiacana* would seem to represent an evolutionary advance over that of *Pholisma* in that it involves a more immediate dependence of the inflorescence on the roots of the host.

We wish to express our indebtedness to Dr. Karel U. Kramer for the Latin diagnosis.

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